A decorative graphic consisting of several overlapping squares in yellow, red, and blue, with a black vertical line passing through them.

NASA/JPL SBIR/STTR Programs

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Outline

- Relationship of NASA SBIR/STTR Program to the Federal Program
- Status of SBIR/STTR Program Renewal
- NASA SBIR/STTR Program Specifics
- NASA 2008 Proposal Solicitation
- Innovation Research Areas of Interest
- Key NASA SBIR/STTR Websites
- Acknowledgements



Federal SBIR Program

Congressionally mandated program, administered by the US Small Business Administration (SBA) Office of Technology.

- SBA ensures through SBIR and STTR that small, high-tech, innovative businesses are a significant part of the Federal Government's R&D efforts.
- All Federal Agencies with an extramural R&D budget >\$100M (SBIR) or >\$1B (STTR) are required to participate.
 - Participating agencies must reserve 2.5% of their extramural R&D budget for SBIR and 0.3% for STTR.
 - Extramural budget: agency R&D, including FFRDCs and contractor-operated facilities, but excluding funds for government-owned and operated facilities.
- See <http://www.sba.gov> or <http://www.sbir.gov/> (an official US government source for SBIR information) and links therein for both general and Agency-specific information. Or search on SBIR and an agency name.



11 Federal Agencies Participate in SBIR

- Dept of Agriculture
- Dept of Commerce (NIST, NOAA)
- Dept of Defense (multiple agencies)
- Dept of Education
- Dept of Energy
- Dept of Health & Human Services (NIH, CDC, FDA, AHRQ, NCI)
- Dept of Homeland Security
- Dept of Transportation
- Environmental Protection Agency
- NASA
- National Science Foundation - NSF
- Remember: Proposal solicitation details, frequencies, submittal and award processes, due dates, and award sizes/types vary by agency. It is important to check the Agency-specific websites.



5 Federal Agencies Participate in STTR

- Dept of Defense (multiple agencies)
- Dept of Energy
- National Institutes of Health - NIH
- NASA
- National Science Foundation - NSF
- Remember: Proposal solicitation details, frequencies, submittal and award processes, due dates, and award sizes/types vary by agency. It is important to check the Agency-specific websites.



Status of SBIR Program Renewal

- The SBIR program was established under the Small Business Innovation Development Act of 1982 (P.L. 97-219), reauthorized until September 30, 2000 by the Small Business Research and Development Enhancement Act (P.L. 102-564), and reauthorized again until September 30, 2008 by the Small Business Reauthorization Act of 2000 (P.L. 106-554).
 - Legislation to reauthorize SBIR beyond 2008 has passed the House (H.R. 5819) and is currently in the Senate.
 - For more information on the progress of the legislation, see, for example: <http://www.thomas.gov> (Legislative information from the Library of Congress).



Status of STTR Program Renewal

- The STTR program was established by the Small Business Technology Transfer Act of 1992 (Public Law 102-564, Title II), reauthorized until the year 2001 by the Small Business Reauthorization Act of 1997 (P.L. 105-135), and reauthorized again until September 30, 2009, by the Small Business Technology Transfer Program Reauthorization Act of 2001 (P.L. 107-50).
 - Based on the SBIR example, anticipate that legislation to reauthorize STTR beyond 2009 will be similarly introduced next year.



NASA SBIR/STTR Program Overview

The Innovative Partnerships Program Office (IPP), under the Office of the NASA Associate Administrator, provides overall policy direction for implementing the NASA SBIR/STTR programs.

- The NASA SBIR/STTR Program Management Office, which operates the programs in conjunction with NASA Mission Directorates and Centers, is hosted at NASA Ames.
- The NASA Shared Services Center provides overall procurement management for the programs.
- All of the NASA centers actively participate in the SBIR/STTR program and reinforce NASA's objective of infusing SBIR/STTR developed technologies into its programs and projects.
- For more details see <http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm>



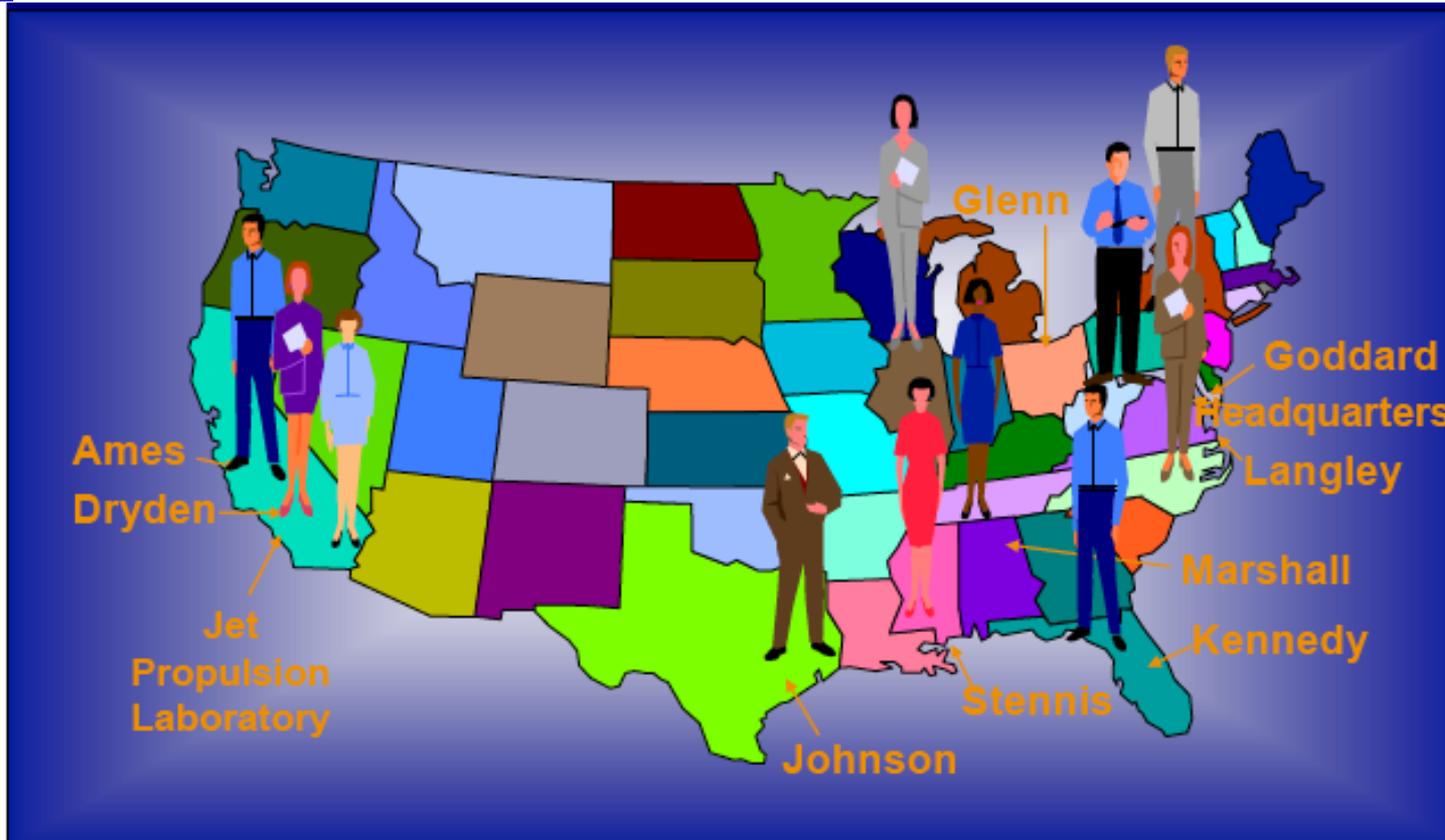
NASA SBIR/STTR Program

- Four NASA Mission Directorates participate in the overall Program:
 - Aeronautics Research (ARMD)
 - <http://www.aeronautics.nasa.gov/>
 - Exploration Systems (ESMD)
 - <http://www.nasa.gov/directorates/esmd/home/index.html>
 - Science (SMD)
 - <http://nasascience.nasa.gov/>
 - Space Operations (SOMD)
 - <http://www.hq.nasa.gov/osf/>



NASA Participating Centers

All ten NASA Centers, including JPL, participate in the management of NASA's SBIR/STTR Program.



National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California



NASA SBIR/STTR Phase 1 and 2

| Phase 1 Contracts | SBIR | STTR |
|-------------------------------|------------|------------|
| Maximum Contract Value | \$ 100,000 | \$100,000 |
| Maximum Period of Performance | 6 months | 12 months |
| Phase 2 Contracts | SBIR | STTR |
| Maximum Contract Value | \$600,000 | \$ 600,000 |
| Maximum Period of Performance | 24 months | 24 months |

- Historically:
 - Ratio of Phase 1 proposals/awards is approx 7:1 (SBIR) and 5:1 (STTR).
 - About 40% of completed Phase 1 projects receive Phase 2 funding.
- For more info see <http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm> and http://www.sba.gov/aboutsba/sbaprograms/sbir/sbirstir/sbir_sbir_description.html



Current NASA Phase 2 Optics Contracts

(in addition to those on this conference's agenda)

Seabrook Engineering - Beam Combination for Sparse Aperture Telescopes (2006)

Developing an alternative beam combiner for Stellar Imager (SI), a 30-aperture, interferometric telescope chosen as one of fifteen Vision Missions. Called the Spatial Frequency Remapper (SFR), it trades the large field of view of a Fizeau design for simultaneous observations at multiple wavelengths.

Xinetics, Inc. - Integrated Wavefront Corrector (2005)

Developing a small robust wavefront corrector designed to be employed in space based optical systems. This integrated wavefront corrector will combine new types of deformable mirrors, Photonex Meniscus, with tip/tilt stage, with Xinetics co-fired ceramic actuators.

Reflective X-ray Optics, LLC - Gadolinium EUV Multilayers for Solar Imaging Near 60 nm (2006)

Reflective X-ray Optics, LLC is developing a new class of extreme ultraviolet (EUV) multilayer coatings containing the rare-earth element gadolinium (Gd), designed as efficient narrow-band reflective mirror coatings operating near normal incidence in the 60-65 nm wavelength range.



Current NASA Phase 2 Optics Contracts

(in addition to those on this conference's agenda)

Los Gatos Research - Nonintrusive Optical Thermometers for Real-Time Control of Fabrication Processes (2005)

Los Gatos Research is developing and deploying a novel instrument ("Optical Thermometer") that provides real-time, in situ, non-contact measurements of substrate temperature in optical coating reactors. The instrument will employ an inexpensive diode laser, fiber optic components, and established laser interferometry methods to determine substrate temperature at multiple locations with a replicate precision of better than 0.01 degrees C in a measurement time of less than 0.01 seconds.

OptiGrate - High Resolving Power Volume Diffractive Gratings for 400-2700 nm Spectral Range (2005)

OptiGrate is developing high (spectral) resolution volume diffraction Bragg gratings using photo-thermo-refractive glass. Production of these high efficiency volume diffractive elements in photo-thermo-refractive glass is based on a technology exclusively licensed from the University of Central Florida.

MetroLaser, Inc. - One-Dimensional Tunable Photonic-Crystal IR Filter (2005)

Metrolaser is developing a large aperture high resolution Fabry-Perot Interferometer for space-based and airborne multi-spectral imaging and remote sensing systems, including tropospheric chemistry studies and atmospheric science. The heart of this instrument is a narrow bandpass infrared filter formed by two parallel high-reflectivity low-loss multilayer dielectric mirrors that form a precisely controlled cavity.



NASA SBIR Phase 3

- NASA may award Phase 3 contracts for products or services with non-SBIR/STTR funds. An agency that wishes to fund a Phase 3 project is not required to conduct another competition.
- Phase 3 work may be for products, production, services, R/R&D, or any combination of these. A Federal agency may enter into a Phase 3 agreement at any time with a Phase 1 or Phase 2 awardee.
- There is no limit on the number, duration, type, or dollar value of Phase 3 awards made to a business concern.
- There is no limit on the time that may elapse between a Phase 1 or Phase 2 and a Phase 3 award.
- For more information see the '08 NASA SBIR/STTR Proposal Solicitation.



DoD SBIR/STTR Program

- The current DoD cycle is the SBIR 08.3 and STTR 08.B combined solicitation. The solicitation opens August 28 and closes September 24.
- Phase I awards are \$100,000 for 6 to 9 months, Phase II awards are \$750,000 for 2 years
- Includes:
 - Air Force (<http://www.sbirsttrmall.com/Portal.aspx>)
 - Missile Defense Agency (<http://www.winmda.com>)
- Fast Track Program (NASA does not have a Fast Track Program
 - “The Fast Track Program provides matching SBIR funds to eligible firms that attract investment funds from a DoD acquisition program, a non-SBIR/non-STTR government program or Private sector investments. Phase II awards under Fast Track will be for \$1 million maximum, unless specified by the MDA SBIR Program Manager.”



Technology Infusion

2.8 Infusion

[from the '08 NASA SBIR/STTR Proposal Solicitation]

The integration of SBIR/STTR developed knowledge or technologies within NASA Programs and Projects, other government agencies and/or commercial entities. This includes integration with NASA Program and Project funding, development and flight and ground demonstrations.

The primary focus of the NASA SBIR/STTR Program is on infusion in the form of NASA Program or Project applications.



NASA '08 SBIR/STTR Proposal Solicitation

- Access via the NASA SBIR/STTR Home Page
<http://sbir.gsfc.nasa.gov/SBIR/SBIR.html>
- Or via direct link:
<http://sbir.gsfc.nasa.gov/SBIR/sbirsttr2008/solicitation/index.html>
- '08 Solicitation opened July 7, 2008.
- Phase I proposals are due September 4, 2008.
- Only companies with '07 Phase 1 awards are eligible to submit corresponding Phase 2 proposals.
- **Blackout Period:** Offerors should not contact NASA technical program managers and researchers to discuss the specifics of their proposals at any time during the period the solicitation is open.
 - After selections are announced, offerors may request information in the form of a debriefing. See <http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm>



'08 SBIR/STTR Proposal Solicitation ARMD Topics (1 of 3)

TOPIC: A1 Aviation Safety

- A1.01 Mitigation of Aircraft Aging and Durability-Related Hazards
- A1.02 Sensing and Diagnostic Capability for Aircraft Aging and Damage
- A1.03 Prediction of Aging Effects
- A1.04 Aviation External Hazard Sensor Technologies
- A1.05 Crew Systems Technologies for Improved Aviation Safety
- A1.06 Technologies for Improved Design and Analysis of Flight Deck Automation

- A1.07 On-Board Flight Envelope Estimation for Unimpaired and Impaired Aircraft

- A1.08 Engine Lining and Prognosis for In-Flight Emergencies
- A1.09 Robust Flare Planning and Guidance for Unimpaired and Impaired Aircraft

- A1.10 Detection of In-Flight Aircraft Anomalies
- A1.11 Integrated Diagnosis and Prognosis of Aircraft Anomalies
- A1.12 Mitigation of Aircraft Structural Damage



'08 SBIR/STTR Proposal Solicitation

ARMD Topics (2 of 3)

TOPIC: A2 Fundamental Aeronautics

A2.01 Materials and Structures for Future Aircraft

A2.02 Combustion for Aerospace Vehicles

A2.03 Aero-Acoustics

A2.04 Aeroelasticity

A2.05 Aerodynamics

A2.06 Aerothermodynamics

A2.07 Flight and Propulsion Control and Dynamics

A2.08 Aircraft Systems Analysis, Design and Optimization

A2.09 Rotorcraft

A2.10 Propulsion Systems



'08 SBIR/STTR Proposal Solicitation ARMD Topics (3 of 3)

TOPIC: A3 Airspace Systems

A3.01 NextGen Airspace

A3.02 NextGen Airportal

TOPIC: A4 Aeronautics Test Technologies

A4.01 Ground Test Techniques and Measurement Technology

A4.02 Flight Test Techniques and Measurement Technology



'08 SBIR/STTR Proposal Solicitation ESMD Topics (1 of 5)

TOPIC: X1 Avionics and Software

- X1.01 Automation for Vehicle and Habitat Operations
- X1.02 Reliable Software for Exploration Systems
- X1.03 Radiation Hardened/Tolerant and Low Temperature Electronics and Processors
- X1.04 Integrated System Health Management for Ground Operations

TOPIC: X2 Environmental Control and Life Support

- X2.01 Spacecraft Cabin Ventilation and Thermal Control
- X2.02 Spacecraft Cabin Atmospheric Resource Management and Particulate Matter Removal
- X2.03 Spacecraft Habitation and Waste Management Systems
- X2.04 Spacecraft Environmental Monitoring and Control
- X2.05 Spacecraft Fire Protection



'08 SBIR/STTR Proposal Solicitation ESMD Topics (2 of 5)

TOPIC: X3 Lunar In Situ Resource Utilization

X3.01 Lunar Regolith Excavation and Material Handling

X3.02 Oxygen Production from Lunar Regolith

X3.03 Lunar ISRU Development and Precursor Activities

TOPIC: X4 Structures, Materials and Mechanisms

X4.01 Low Temperature Mechanisms

X4.02 Advanced Radiation Shielding Materials and Structures

X4.03 Expandable Structures

X4.04 Composite Structures - NDE/Structures Health Monitoring

X4.05 Composite Structures - Cryotanks

X4.06 Composite Structures - Manufacturing



'08 SBIR/STTR Proposal Solicitation ESMD Topics (3 of 5)

TOPIC: X5 Lunar Operations

- X5.01 Lunar Surface Systems
- X5.02 Surface System Dust Mitigation
- X5.03 Extravehicular Activity (EVA)

TOPIC: X6 Energy Generation and Storage

- X6.01 Fuel Cells for Surface Systems
- X6.02 Advanced Space-Rated Batteries

TOPIC: X7 Cryogenic Systems

- X7.01 Cryogenic Storage for Space Exploration Applications
- X7.02 Cryogenic Fluid Transfer and Handling
- X7.03 Cryogenic Instrumentation for Ground and Flight Systems



'08 SBIR/STTR Proposal Solicitation ESMD Topics (4 of 5)

TOPIC: X8 Protection Systems

X8.01 Detachable, Human-Rated, Ablative Environmentally Compliant TPS

TOPIC: X9 Exploration Crew Health Capabilities

X9.01 Crew Exercise System

TOPIC: X10 Exploration Medical Capability

X10.01 In-Flight Diagnosis and Treatment

X10.02 EVA Suit Monitoring and Treatment

TOPIC: X11 Behavioral Health and Performance

X11.01 Behavioral Assessment Tools



'08 SBIR/STTR Proposal Solicitation ESMD Topics (5 of 5)

TOPIC: X12 Space Human Factors and Food Systems

X12.01 Space Human Factors Assessment Tools

X12.02 Advanced Food Technologies

TOPIC: X13 Space Radiation

X13.01 Active Charged Particle and Neutron Radiation Measurement Technologies

X13.02 Technology/Technique for Imaging Radiation Damage at the Cellular Level

TOPIC: X14 In-Flight Biological Sample Preservation and Analysis

X14.01 On Orbit Ambient Biological Sample Preservation Techniques

X14.02 On Orbit Cell Counting and Analysis Capability



'08 SBIR/STTR Proposal Solicitation

SMD Topics (1 of 4)

TOPIC: S1 Sensors, Detectors, and Instruments

- S1.01 Lidar System Components
- S1.02 Active Microwave Technologies
- S1.03 Passive Microwave Technologies
- S1.04 Sensor and Detector Technology for Visible, IR, Far IR and Submillimeter
- S1.05 Detector Technologies for UV, X-Ray, Gamma-Ray and Cosmic-Ray Instruments
- S1.06 Particles and Field Sensors and Instrument Enabling Technologies
- S1.07 Cryogenic Systems for Sensors and Detectors
- S1.08 In Situ Airborne, Surface, and Submersible Instruments for Earth Science
- S1.09 In Situ Sensors and Sensor Systems for Planetary Science
- S1.10 Space Geodetic Observatory Components
- S1.11 Lunar Science Instruments and Technology



'08 SBIR/STTR Proposal Solicitation

SMD Topics (2 of 4)

TOPIC: S2 Advanced Telescope Systems

- S2.01 Precision Spacecraft Formations for Telescope Systems
- S2.02 Proximity Glare Suppression for Astronomical Coronagraphy
- S2.03 Precision Deployable Optical Structures and Metrology
- S2.04 Optical Devices for Starlight Detection and Wavefront Analysis
- S2.05 Optics Manufacturing and Metrology for Telescope Optical Surfaces

TOPIC: S3 Spacecraft and Platform Subsystems

- S3.01 Avionics and Electronics
- S3.02 Thermal Control Systems
- S3.03 Power Generation and Storage
- S3.04 Propulsion Systems
- S3.05 Balloon Technology, Terrestrial and Planetary



'08 SBIR/STTR Proposal Solicitation SMD Topics (3 of 4)

TOPIC: S4 Low-Cost Small Spacecraft and Technologies

S4.01 NanoSat Launch Vehicle Technologies

S4.02 Rapid End-to-End Mission Design and Simulation

S4.03 Cost Modeling

S4.04 Reusable Flight Software

TOPIC: S5 Robotic Exploration Technologies

S5.01 Planetary Entry, Descent, Ascent, Rendezvous and Landing
Technology

S5.02 Sample Collection, Processing, and Handling

S5.03 Surface and Subsurface Robotic Exploration

S5.04 Technologies for Low Mass Mars Ascent Vehicles (PAV)



'08 SBIR/STTR Proposal Solicitation SMD Topics (4 of 4)

TOPIC: S6 Information Technologies

- S6.01 Technologies for Large-Scale Numerical Simulation
- S6.02 Sensor and Platform Data Processing and Control
- S6.03 Data Analyzing and Processing Algorithms
- S6.04 Data Management - Storage, Mining and Visualization
- S6.05 Software as a Service to Large Scale Modeling



'08 SBIR/STTR Proposal Solicitation

SOMD Topics (1 of 2)

TOPIC: O1 Space Communications

- O1.01 Coding, Modulation, and Compression
- O1.02 Antenna Technology
- O1.03 Reconfigurable/Reprogrammable Communication Systems
- O1.04 Miniaturized Digital EVA Radio
- O1.05 Communication for Space-Based Range
- O1.06 Long Range Optical Telecommunications
- O1.07 Long Range Space RF Telecommunications
- O1.08 Lunar Surface Communication Networks and Orbit Access Links
- O1.09 Software for Space Communications Infrastructure Operations

TOPIC: O2 Space Transportation

- O2.01 Automated Collection and Transfer of Launch Range
Surveillance/Intrusion Data
- O2.02 Ground Test Facility Instrumentation



'08 SBIR/STTR Proposal Solicitation

SOMD Topics (2 of 2)

TOPIC: O3 Processing and Operations

- O3.01 Crew Health and Safety Including Medical Operations
- O3.02 Human Interface Systems and Technologies for Spacesuits
- O3.03 Vehicle Integration and Ground Processing

TOPIC: O4 Navigation

- O4.01 Metric Tracking of Launch Vehicles
- O4.02 Precision Spacecraft Navigation and Tracking
- O4.03 Lunar Surface Navigation
- O4.04 Timing



NASA SBIR/STTR Key Websites

- NASA SBIR/STTR Home Page:
<http://sbir.gsfc.nasa.gov/SBIR/SBIR.html> and links therein, including:
 - Solicitations: <http://sbir.gsfc.nasa.gov/SBIR/solicit.htm>
 - Awards: <http://sbir.gsfc.nasa.gov/SBIR/awards.htm>
 - Program Information: <http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm>
 - Procurement Information: <http://sbir.gsfc.nasa.gov/SBIR/contracts.htm>
 - Program Schedules: <http://sbir.gsfc.nasa.gov/SBIR/schedule.html>
 - Success Stories and Videos: <http://sbir.gsfc.nasa.gov/SBIR/success.htm>
 - Key Points of Contact:
 - NASA SBIR/STTR Program Management:
<http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm#office>
 - Support Office (REI Systems, Inc):
<http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm#rei>
 - NASA Center SBIR/STTR Program Managers:
<http://sbir.gsfc.nasa.gov/SBIR/pgminfo.htm#centers>



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